

Carbohydrate Polymers

Volume 93, Issue 2, Pages 365-768 (2 April 2013)

1

Heterogeneity in maize starch granule internal architecture deduced from diffusion of fluorescent dextran probes

Original Research Article

Pages 365-373

Sushil Dhital, Kinnari J. Shelat, Ashok K. Shrestha, Michael J. Gidley

Highlights

► Diffusion coefficients of fluorescent dextrans within maize starch granules measured. ► Penetration of dextrans into granules variable but greatly enhanced by amylolysis. ► Individual granules exhibit either slow-type or fast-type dextran diffusion. ► Slow and fast diffusion rates not affected by dextran size or amylolysis. ► Maize starch granules have marked heterogeneity in their internal architecture.

2

Adsorptive decolorization of methylene blue by crosslinked porous starch

Original Research Article

Pages 374-379

Lei Guo, Guiying Li, Junshen Liu, Yanfeng Meng, Yanfeng Tang

Highlights

► We prepared and characterized crosslinked porous starch (CPS) as a safe adsorbent. ► CPS shows higher adsorption capacity to methylene blue than porous starch. ► The equilibrium adsorption data are well described by the Langmuir isotherm model. ► The adsorption of methylene blue on CPS is endothermic and spontaneous in nature. ► The thermodynamics data are in good agreement with physical adsorption mechanism.

3

Preparation and characterization of sodium alginate modified with collagen peptides

Original Research Article

Pages 380-385

Lihong Fan, Mi Cao, Song Gao, Tan Wang, Huan Wu, Min Peng, Xiaoyu Zhou, Min Nie

Highlights

► SA-COP was prepared by collagen peptides and sodium alginate. ► SA-COP exhibited good hydrogen peroxide scavenging abilities. ► SA-COP showed good cell viability.

4□

***Aegle marmelos* fruit pectin for food and pharmaceuticals: Physico-chemical, rheological and functional performance**

Original Research Article

Pages 386-394

Manish Jindal, Vineet Kumar, Vikas Rana, A.K. Tiwary

Highlights

► BFP exhibited low SI, acetyl value, DE and high anhydrouronic acid content. ► Absence of hemagglutinating activity and antinutritional factors. ► Better emulsion capacity and stability than citrus pectin. ► Significant concentration-dependent prolongation of prothrombin time. ► Better antimicrobial potency than citrus pectin at all concentrations.

5□

Purification and characterization of an antitumor polysaccharide from *Portulaca oleracea* L.

Original Research Article

Pages 395-400

Huan Shen, Guo Tang, Guang Zeng, Yongjin Yang, Xingwei Cai, Dongli Li, Hongchen Liu, Ningxin Zhou

Highlights

► We purified a unique polysaccharide component (POP) from *Portulaca oleracea*. ► POP had pronounced anti-tumor effects in vivo model. ► POP potentiated the animal's immune responses. ► POP protected the liver and kidney from damage. ► The anti-tumor effect of POP could be associated with its immunostimulating properties.

6□

Effects of Ar-H₂-N₂ microwave plasma on chitosan and its nanoliposomes blend thin films designed for tissue engineering applications

Original Research Article

Pages 401-411

H.Y. Zhang, F. Cleymand, C. Noël, C.J.F. Kahn, M. Linder, A. Dahoun, G. Henrion, E. Arab-Tehrany

Highlights

► The double functionalizations of chitosan by nanoliposomes and cold plasma. ► Improvement of the wettability and surface energy of chitosan and its nanoliposomes blend films. ► The lipid compositions influence on plasma treatment.

7□

Influence of pretreatment of cotton yarns prior to biopolishing

Pages 412-415

A.A. Ulson de Souza, F.C.S. Ferreira, S.M.A. Guelli U. Souza

Highlights

► A pretreatment on the accessibility of the yarn to the enzyme during biopolishing was studied. ► The pretreatment promotes enzymatic attack in situations where this is not favored. ► Pretreatment with water for 24 h is important for inducing the enzymatic attack. ► After the biopolishing the yarns showed less shrinkage. ► Pretreated before biopolishing promotes greater spacing between the chains.

8□

Oligosaccharides and monomeric carbohydrates production from olive tree pruning biomass

Original Research Article

Pages 416-423

Soledad Mateo, Juan G. Puentes, Sebastián Sánchez, Alberto J. Moya

Highlights

► Carbohydrate generation from olive tree pruning biomass is proposed. ► Severity factor is employed to study important parameters related to oligosaccharides and sugars production. ► Thermal pretreatments with acid or liquid hot water were performed. ► Pretreatments conditions were optimized to a possible liquid fermentation.

9□

Accessibility of cellulose: Structural changes and their reversibility in aqueous media

Original Research Article

Pages 424-429

Raili Pönni, Eero Kontturi, Tapani Vuorinen

Highlights

► Wet acidic treatments cause similar changes in the pulp as drying. ► Wet alkaline treatments cause a dynamic equilibrium in cellulose accessibility. ► Temperature influences the changes in cellulose accessibility during wet treatments. ► Alkaline treatments are hypothesized to influence cellulose crystallinity.

10

Preparation, drug release and cellular uptake of doxorubicin-loaded dextran-b-poly(ϵ -caprolactone) nanoparticles

Original Research Article

Pages 430-437

Bengang Li, Qing Wang, Xin Wang, Chongzhi Wang, Xiqun Jiang

Highlights

► Dextran-b-PCL diblock copolymers were synthesized by the end-to-end coupling between dextran and poly(ϵ -caprolactone). ► Drug-loaded dextran-b-PCL nanoparticles were prepared by a modified nanoprecipitation method. ► *In vitro* release of drug from dextran-b-PCL nanoparticles showed a sustained release manner. ► The fluorescence imaging showed that Dex-b-PCL nanoparticles could be easily uptaken by cancer cells.

11

Phase transfer-catalyzed synthesis of highly acrylated hyaluronan

Pages 438-441

Jana Becher, Stephanie Möller, Matthias Schnabelrauch

Highlights

► Hyaluronan acrylates were prepared using phase-transfer conditions. ► High degrees of acrylation ranging up to 1.7 per disaccharide repeating unit are accessible. ► Synthesized hyaluronan acrylates form dimensionally stable hydrogels by UV or visible light initiated photo-crosslinking.

12

Cardioprotective and antioxidant activities of a polysaccharide from the root bark of *Aralia elata* (Miq.) Seem

Original Research Article

Pages 442-448

Jing Zhang, Haiyan Wang, Yusheng Xue, Qiangsun Zheng

Highlights

► A polysaccharide AEP-w1 was isolated from the root bark of *Aralia elata*. ► The antioxidant and cardioprotective potential of AEP-w1 were evaluated *in vitro*. ► AEP-w1 showed potent free radical scavenging activity and reducing power. ► AEP-w1 pretreatment protected H9c2 cells from H₂O₂-induced injury. ► AEP-w1 pretreatment exhibited inhibition effect on mitochondrial dysfunction.

13

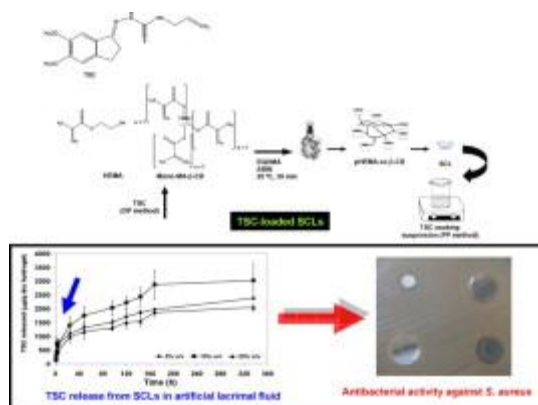
β -Cyclodextrin hydrogels for the ocular release of antibacterial thiosemicarbazones

Original Research Article

Pages 449-457

Romina J. Glisoni, María J. García-Fernández, Marylú Pino, Gabriel Gutkind, Albertina G. Moglioni, Carmen Alvarez-Lorenzo, Angel Concheiro, Alejandro Sosnik

Graphical abstract



Highlights

► We develop β -CD hydrogels for the ocular release of thiosemicarbazones. ► An antimicrobial thiosemicarbazone was efficiently loaded into the networks. ► Hydrogels provided a controlled release for at least two weeks. ► Drug-loaded networks inhibited the growth of *P. aeruginosa* and *S. Aureus in vitro*.

14

Atomic force microscopy imaging of carrageenans from red algae of Gigartinaceae and Tichocarpaceae families

Original Research Article

Pages 458-465

E.V. Sokolova, E.A. Chusovitin, A.O. Barabanova, S.A. Balagan, N.G. Galkin, I.M. Yermak

Highlights

► K-, κ/β - and κ/ι -carrageenans form fibrous network-like structures. ► Compared to κ -carrageenan, κ/β -carrageenan network was more open with coarser fibers. ► λ -Carrageenan formed honeycombed structures at high concentrations.

15

Regioselective modification of a xyloglucan hemicellulose for high-performance

biopolymer barrier films

Original Research Article

Pages 466-472

Joby J. Kochumalayil, Qi Zhou, Wakako Kasai, Lars A. Berglund

Highlights

► Regioselective xyloglucan modification with preserved cellulose backbone. ► High Tg of xyloglucan (275 °C) reduced by more than 100 °C. ► Reduced moisture sorption for xyloglucan by chemical modification. ► New route to cellulose derivative without the use of harmful solvents.

16

Cloning of inulin fructotransferase (DFA III-producing) gene from *Arthrobacter* sp. L68-1

Pages 473-477

Kazutomo Haraguchi

17

Structural elucidation of an extracellular polysaccharide produced by the marine fungus *Aspergillus versicolor*

Original Research Article

Pages 478-483

Yin Chen, Wenjun Mao, Yan Gao, Xiancun Teng, Weiming Zhu, Yanli Chen, Chunqi Zhao, Na Li, Chunyan Wang, Mengxia Yan, Jimiao Shan, Cong Lin, Tao Guo

Highlights

► AWP was obtained from the fermented liquid of *Aspergillus versicolor*. ► Structure of AWP was elucidated by GC-MS, FTIR and NMR. ► The backbone of AWP consisted of glucopyranose units. ► The side chain contained mannopyranose units. ► AWP was a novel polysaccharide different from other exopolysaccharides.

18

Electrospinning of commercial guar-gum: Effects of purification and filtration

Original Research Article

Pages 484-491

Adriana F. Lubambo, Rilton A. de Freitas, Maria-R. Sierakowski, Neoli Lucyszyn, Guilherme L. Sasaki, Bruno M. Serafim, Cyro Ketzer Saul

Highlights

► Guar gums were electrospun on mica and copper at several concentrations. ► Two purification procedures and filtration sequence were applied on the solution. ► The electrospun fiber diameter decreased with membrane pore diameter reduction. ► Purification and filtration enhanced the electrospun fiber morphology.

19

Influence of medium-chain triglycerides on expansion and rheological properties of extruded corn starch

Original Research Article

Pages 492-498

Mario Horvat, M. Azad Emin, Bernhard Hochstein, Norbert Willenbacher, Heike Petra Schuchmann

Highlights

► Addition of MCT-oil increased sectional expansion by up to three times. ► Longitudinal expansion only slightly decreased upon oil addition. ► Thermomechanical history of starch was not affected by oil. ► We determined the Bagley pressure, which is a measure of elongational properties. ► We observed a change in the Bagley pressure by addition of MCT-oil.

20

Polysaccharide nanofiber made from euglenoid alga

Original Research Article

Pages 499-505

Motonari Shibakami, Gen Tsubouchi, Makoto Nakamura, Masahiro Hayashi

Highlights

► Triplex and nanofiber made from paramylon were prepared. ► Preparation process hinges on the self-assembly ability of paramylon. ► Fiber width is controlled by adjusting NaOH concentration of paramylon solutions. ► Nanofiber has an ordered structure produced by a hierarchic association process.

21

Novel cationic-modified salep as an efficient flocculating agent for settling of cement slurries

Original Research Article

Pages 506-511

Ali Pourjavadi, Seyed Mahmoud Fakoopoor, Seyed Hassan Hosseini

Highlights

► A new cationic salep was conveniently prepared and used for flocculation of cement. ► High salep/water and monomers/salep ratios are important synthesis parameters. ► Cationic charge was important for efficiency of flocculation at lower dosages.

22

Microwave synthesis and *in vitro* stability of diclofenac- β -cyclodextrin conjugate for colon delivery

Original Research Article

Pages 512-517

Amélia C.F. Vieira, Arménio C. Serra, Rui A. Carvalho, Alexandra Gonsalves, Ana Figueiras, Francisco J. Veiga, Abdul W. Basit, António M. d'A. Rocha Gonsalves

Highlights

► Novel cyclodextrin conjugate synthesised using microwave irradiation. ► Conjugates fully characterized using spectroscopic methods and HPLC analysis. ► The conjugate was stable in simulated gastric and small intestinal fluids. ► Conjugate readily hydrolyzed in human colonic conditions.

23

Selective adsorption of hemoglobin using polymer-grafted-magnetite nanocellulose composite

Original Research Article

Pages 518-527

Thayyath Sreenivasan Anirudhan, Sylaja Raveendran Rejeena

Highlights

► The hydrogel P(MAA-co-VSA)-g-MNCC was synthesized by graft copolymerization reaction. ► P(MAA-co-VSA)-g-MNCC was characterized using FTIR, XRD and TG techniques. ► Adsorption characteristics of hemoglobin (Hb) on P(MAA-co-VSA)-g-MNCC were studied. ► The adsorbent can be used in the selective recovery of Hb from aqueous solutions. ► Regeneration of spent adsorbent was possible with 0.01 M KOH.

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Ceric ion initiated synthesis of polyacrylamide grafted oatmeal: Its application as flocculant for wastewater treatment

Original Research Article

Pages 528-536

Srijita Bharti, Sumit Mishra, Gautam Sen

Highlights

► OAT-g-PAM was synthesized by 'ceric ion induced (conventional) method'. ► FTIR spectroscopy provided experimental proof of the proposed mechanism of synthesis. ► Synthesized grades were studied for efficacy as flocculant for waste water treatment. ► OAT-g-PAM showed higher flocculation efficacy than oatmeal. ► Higher the percentage grafting of OAT-g-PAM, higher is the intrinsic viscosity, higher is its flocculation efficacy.

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Polysaccharide-covered nanoparticles with improved shell stability using click-chemistry strategies

Original Research Article

Pages 537-546

Maxime Laville, Jérôme Babin, Isabel Londono, Mélanie Legros, Cécile Nouvel, Alain Durand, Régis Vanderesse, Michèle Leonard, Jean-Luc Six

Highlights

► Dextran-g-PLA copolymers were obtained from azide-multifunctionalized dextran and α -alkyne PLA. ► Biodegradable core/shell nanoparticles have been produced by 2 processes. ► Physically-adsorbed or covalently-linked dextran shell is described. ► Click-chemistry within these processes improves the shell stability, even in the presence of SDS.

26 

Structures of (1 → 6)- β -D-glucans from *Bulgaria inquinans* (Fries) and their immunological activities

Original Research Article

Pages 547-552

Hongtao Bi, Tingting Gao, Dongbo Liu, Guihua Tai, Min Wei, Yifa Zhou

Highlights

► Three branched (1 → 6)- β -d-glucans were isolated from *B. inquinans* (Fries). ► All the (1 → 6)- β -d-glucans could significantly increase lymphocytes proliferation *in vivo*. ► Branched (1 → 6)- β -d-glucans had more significantly activities than unbranched one. ► The activity of branched (1 → 6)- β -d-glucans increased along with molecular weight.

27

Cellulose–polymer–Ag nanocomposite fibers for antibacterial fabrics/skin scaffolds

Original Research Article

Pages 553-560

Gownolla Malegowd Raghavendra, Tippabattini Jayaramudu, Kokkarachedu Varaprasad, Rotimi Sadiku, S. Sinha Ray, Konduru Mohana Raju

Highlights

► Two different types of AgNPs formed are between 2 and 8 nm in size (by green process). ► Small size polymer AgNPs with cellulose fibers enhanced the inactivation of bacteria. ► Energy conserving process (which were reduced form carbohydrates). ► The green process is a low ingredient (<1%) consumption and effective output process. ► Functional ‘CSNCPs’ could find application in the textiles and medical application.

28

Intermolecular interactions between natural polysaccharides and silk fibroin protein

Review Article

Pages 561-573

Songmin Shang, Lei Zhu, Jintu Fan

Highlights

► Interactions between natural polysaccharides and silk were systematically studied. ► Hydrogen bonding, electrostatic interactions and covalent bonding are focused on. ► The effect of these interactions on structures and properties was investigated. ► Such interactions can change the conformation of silk fibroin protein. ► They can also improve physical and chemical properties of the polymer matrix.

29

Self-association of novel mixed 3-mono-*O*-alkyl cellulose: Effect of the hydrophobic moieties ratio

Original Research Article

Pages 574-581

Antonio Sullo, Yunhui Wang, Andreas Koschella, Thomas Heinze, Tim J. Foster

Highlights

► Cellulose was regioselectively substituted at position 3 of the repeating unit. ► The substituents are ethyl and propyl in different ratios. ► Gelation (aggregation) occurs on heating above a critical

temperature (T_m). ► Transition temperature and gel strength both depend on the ethyl/propyl ratio. ► The higher the propyl the lower T_m and the stronger the gel.

30□

Effect of ultrasonic treatments on nanoparticle preparation of acid-hydrolyzed waxy maize starch

Original Research Article

Pages 582-588

Hee-Young Kim, Jung-Ah Han, Dong-Keon Kweon, Jong-Dae Park, Seung-Taik Lim

Highlights

- Mild acid hydrolysis combined with ultrasonication could effectively produce starch nanoparticles. ► Ultrasonic treatments behaved as a dissociation force of the nanoparticles clustered in the aggregates.
- However, starch nanoparticles treated by ultrasonication may have reduced crystallinity.

31□

Structural features and water holding capacities of pressed potato fibre polysaccharides

Original Research Article

Pages 589-596

Urmila R. Ramaswamy, Mirjam A. Kabel, Henk A. Schols, Harry Gruppen

Highlights

- Polysaccharide interactions affect water holding capacity in pressed potato fibres. ► Modifications in interactions change water holding capacity. ► Interactions restored via hydration affect water holding capacity. ► Pectic galactans and xyloglucans could be important for interactions with water.

32□

Enhanced biodegradation resistance of biomodified jute fibers

Original Research Article

Pages 597-603

Suwendu Manna, Prosenjit Saha, Debasis Roy, Ramkrishna Sen, Basudam Adhikari, Sancharini Das

Highlights

- A whole-cell catalyzed bio-process is developed to transesterify LCFs fibers. ► Treated fibers were stronger, more hydrophobic and biodegradation resistant. ► The process is inexpensive compared to chemical and enzymatic alternatives.

33

Depolymerization of fucosylated chondroitin sulfate from sea cucumber, *Pearsonothuria graeffei*, via ^{60}Co irradiation

Original Research Article

Pages 604-614

Nian Wu, Xingqian Ye, Xin Guo, Ningbo Liao, Xinzi Yin, Yaqin Hu, Yujing Sun, Donghong Liu, Shiguo Chen

Highlights

► A novel method for depolymerization of fCS by ^{60}Co irradiation was developed. ► Within mild irradiation conditions, fCS fragments kept similar structure to native fCS. ► The irradiation broke selectively the glucuronic acid units in the backbone of fCS. ► The fCS anticoagulant activities were related to their molecular weight. ► fCS oligosaccharides with low anticoagulant activity could be a potential antithrombotic drug.

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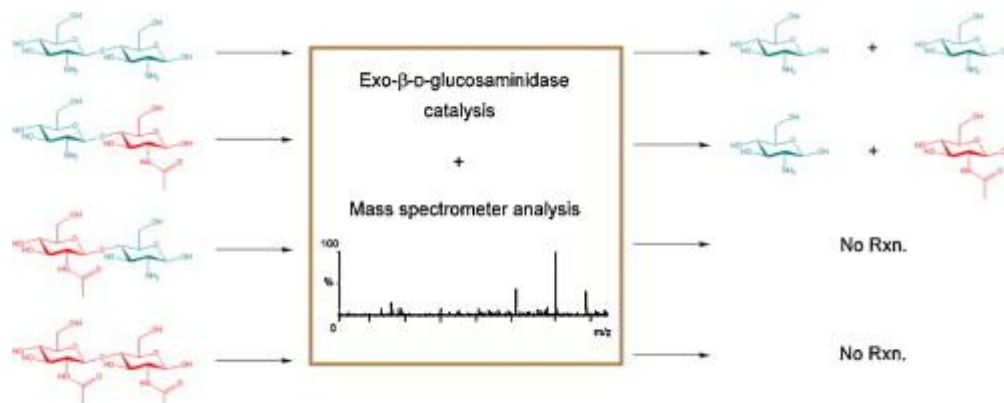
Catalytic function of a newly purified exo- β -D-glucosaminidase from the entomopathogenic fungus *Paecilomyces lilacinus*

Original Research Article

Pages 615-621

Cheng-Fu Chao, Yi-Yun Chen, Chih-Yu Cheng, Yaw-Kuen Li

Graphical abstract



Highlights

► β -D-Glucosaminidase was first found in *Paecilomyces lilacinus*. ► *Paecilomyces* was engineered to secrete more β -D-glucosaminidase. ► A retaining β -D-glucosaminidase was purified and characterized. ► This enzyme hydrolyzes 95% deacetylated chitosan but not chitin. ► The cleavage pattern was identified by real-time mass spectrometry.

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Preparation and properties of biodegradable films from *Sterculia urens* short fiber/cellulose green composites

Original Research Article

Pages 622-627

J. Jayaramudu, G. Siva Mohan Reddy, K. Varaprasad, E.R. Sadiku, S. Sinha Ray, A. Varada Rajulu

Highlights

► Newly identified fabrics from the tree *Sterculia urens* were extracted. ► Cellulose matrix/*S. urens* short fiber as a reinforcement films were prepared by a 'green' way. ► The green composite films are safe, stable and biodegradable. ► Thermal stability and mechanical properties of green composites were improved. ► These green composite films showed potential application in the packaging and biomaterials field.

36

Isolation and characterization of microcrystalline cellulose from oil palm biomass residue

Original Research Article

Pages 628-634

M.K. Mohamad Haafiz, S.J. Eichhorn, Azman Hassan, M. Jawaid

Highlights

► Microcrystalline cellulose (MCC) was successfully isolated from oil palm biomass. ► Isolated MCC contains cellulose I with 87% crystallinity. ► MCC from OPEFB-pulp is shown to have good thermal stability. ► Atomic force microscopy shows that isolated MCC shows regular spherical particles.

37

How can genipin assist gelatin/carbohydrate chitosan scaffolds to act as replacements of load-bearing soft tissues?

Original Research Article

Pages 635-643

Melika Sarem, Fathollah Moztarzadeh, Masoud Mozafari

Highlights

► A systematic study of genipin cross-linking effects on G/CC scaffolds is presented. ► The properties of CC scaffolds are improved by addition of gelatin and genipin. ► Cross-linking with genipin can effectively enhance the stability of the scaffolds. ► The porosity and pore size originally depend on the cross-linking methods. ► Scaffold-cross-linking method shows the most suitable physico-chemical behavior. ► The G60/CC40 scaffolds cross-linked with 1% genipin exhibit excellent properties.

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Stretching properties of xanthan, carob, modified guar and celluloses in cosmetic emulsions

Original Research Article

Pages 644-650

Laura Gilbert, Vincent Loisel, Géraldine Savary, Michel Grisel, Céline Picard

Highlights

► The filament stretching properties of cosmetic O/W emulsions were investigated. ► A method using a texture analyzer was developed to measure the stretchability. ► The maximum stretchable length was highly correlated to the sensory *Stringiness*. ► Different stretching behaviors were shown among the 5 emulsions of polysaccharides. ► The emulsion containing the xanthan gum was the most stretchable one.

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Characterization of mucilage polysaccharides, arabinogalactan proteins and cell-wall hemicellulosic polysaccharides isolated from flax seed meal: A wealth of structural moieties

Original Research Article

Pages 651-660

Sayani Ray, Florence Paynel, Claudine Morvan, Patrice Lerouge, Azeddine Driouich, Bimalendu Ray

Highlights

► Thirty percent of the matter of flax meal can be selected for specific applications. ► Besides RG-I and AX mucilages, HGA, Ara and Glc rich moieties, and AGP are present in flax meal. ► Structure of flax seed hemicelluloses was proposed for the first time. ► Structural analysis confirms that the isolated xylan was a branched heteroxylan. ► The xyloglucan is XXXG-type but also contain XXGG structure.

40

Cetuximab conjugated O-carboxymethyl chitosan nanoparticles for targeting EGFR overexpressing cancer cells

Original Research Article

Pages 661-669

S. Maya, Lekshmi G. Kumar, Bruno Sarmento, N. Sanoj Rejinold, Deepthy Menon, Shantikumar V. Nair, R. Jayakumar

Highlights

► Cetuximab conjugation enabled targeted delivery of Paclitaxel to cancer cells. ► Cet-PTXL-O-CMC Nps were specifically uptaken by EGFR over expressing cancer cells. ► Targeted Nps showed superior antiproliferative activity over non-targeted Nps. ► Cet-PTXL-O-CMC NPs enhances selective therapeutic efficacy for EGFR positive tumors.

41□

An insight into the emerging exopolysaccharide gellan gum as a novel polymer

Review Article

Pages 670-678

Vipul D. Prajapati, Girish K. Jani, Bhumi S. Zala, Tohra A. Khutliwala

Highlights

► History and general introduction of gellan gum is stated in brief. ► Broad classification and detailed production process is described. ► Pharmaceutical applications of reported gellan gum formulations are explained in suitable tables.

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Study of glycol chitosan-carboxymethyl β -cyclodextrins as anticancer drugs carrier

Original Research Article

Pages 679-685

Haina Tan, Fei Qin, Dongfeng Chen, Songbai Han, Wu Lu, Xin Yao

Highlights

► New drug carrier glycol chitosan-carboxymethyl β -cyclodextrins has been synthesized. ► The loading and release abilities for hydrophobic anticancer drugs were evaluated by surface plasmon resonance. ► Free carboxymethyl groups around the cavity of β -cyclodextrins improve the loading ability of the carrier. ► The release of doxorubicin is pH-sensitive.

43□

Homogeneous synthesis of hydroxypropyl guar gum in an ionic liquid 1-butyl-3-methylimidazolium chloride

Original Research Article

Pages 686-690

Zhensheng Zhan, Bin Du, Shuhua Peng, Jianping He, Mingyu Deng, Jing Zhou, Ke Wang

Highlights

► We reported a method of homogeneous synthesis of hydroxypropyl guar gum. ► The value of degree of molar substitution was determined by means of ^1H NMR. ► The distribution of the

hydroxypropyl moieties was investigated by ^{13}C NMR. ► The reaction showed a preference at the C_3OH of the mannosyl residues.

44□

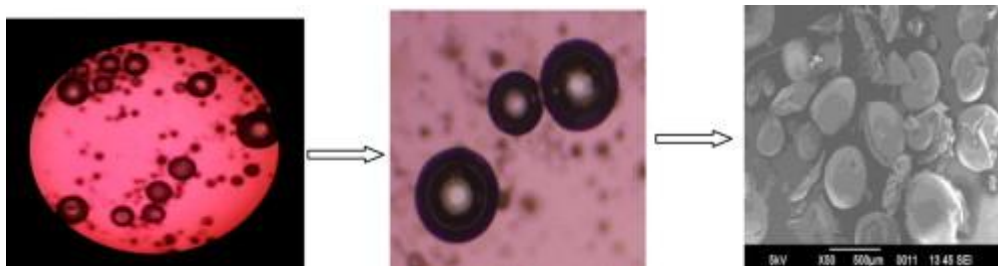
Influence of process variables on essential oil microcapsule properties by carbohydrate polymer–protein blends

Original Research Article

Pages 691-697

Subham Banerjee, Pronobesh Chattopadhyay, Animesh Ghosh, Danswring Goyary, Sanjeev Karmakar, Vijay Veer

Graphical abstract



Highlights

► Formation of microcapsules occurs from a multiple emulsion template. ► Oil encapsulation occurs within carbohydrate–protein blends. ► Prepared formulations showed significant dependency on process parameters. ► It can be used for prolonged release mosquito repellent application.

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Processing of microcrystalline cellulose in dimethyl sulfoxide, urea and supercritical carbon dioxide

Original Research Article

Pages 698-708

Aniket Selarka, Ronald Baney, Siobhan Matthews

Highlights

► Relative crystallinity of cellulose was reduced under DMSO/urea/scCO₂. ► Relative crystallinity reduced with increasing scCO₂ pressure. ► Relative crystallinity reduced from weakening of inter/intra-chain H-bonds in cellulose.

46□

Physicochemical and antibacterial properties of surfactant mixtures with quaternized chitosan microgels

Original Research Article

Pages 709-717

Kristopher E. Richardson, Zheng Xue, Yan Huang, Youngwoo Seo, Yakov Lapitsky

Highlights

► Surfactant mixtures with quaternized chitosan microgels were investigated. ► Colloidal stability, antibacterial activity and solubilization properties were probed. ► Optimal properties were achieved using nonionic surfactants. ► These mixtures may be useful for cleaning and personal care product formulations.

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Multilayered textile coating based on a β -cyclodextrin polyelectrolyte for the controlled release of drugs

Original Research Article

Pages 718-730

Adeline Martin, Nicolas Tabary, Laurent Leclercq, Jatupol Junthip, Stéphanie Degoutin, François Aubert-Viard, Frédéric Cazaux, Joël Lyskawa, Ludovic Janus, Marc Bria, Bernard Martel

Highlights

► Layer by layer process on a non-woven PET using chitosan and a polymer of cyclodextrins ► Building of a multilayer assembly up to 20 layers ► Visible deposition at the surface with charge alternation ► Effective encapsulation and release of a model molecule up to 40 days ► Release dependant on the layer number on the surface.

48 

***In situ* synthesized novel biocompatible titania–chitosan nanocomposites with high surface area and antibacterial activity**

Original Research Article

Pages 731-739

K. Kavitha, S. Sutha, M. Prabhu, V. Rajendran, T. Jayakumar

Highlights

► *In situ* synthesized TiO₂–chitosan series exhibit high surface area (208–265 m²/g). ► TiO₂–chitosan (2:1, v/v) shows enhanced bioactivity and antibacterial activity. ► No significant cytotoxicity in the prepared nanocomposites. ► Swelling behavior of composites increases the probability of cell attachment. ► Optimization of TiO₂–chitosan nanocomposites for biomedical applications.

49 □

Production optimization of invertase by *Lactobacillus brevis* Mm-6 and its immobilization on alginate beads

Original Research Article

Pages 740-746

Ghada E.A. Awad, Hassan Amer, Eman W. El-Gammal, Wafaa A. Helmy, Mona A. Esawy, Magdy M.M. Elnashar

Highlights

► We studied the production of invertase from *Lactobacillus sp.* from breast milk. ► A sequential optimization strategy for identified the enzyme production parameters. ► Immobilization of invertase onto grafted alginate beads. ► Immobilized invertase reuse for 15 cycles with retention of 100% of its activity.

50 □

Formulation of a pectin gel that efficiently traps mycotoxin deoxynivalenol and reduces its bioavailability

Original Research Article

Pages 747-752

Chikako Tamura, Makoto Nakauma, Hiroko Furusawa, Tomoyuki Kadota, Yoichi Kamata, Motohiro Nishijima, Seigo Itoh, Yoshiko Sugita-Konishi

Highlights

► Low-methoxyl amidate pectin (LMA) gelation trapped the toxicant, deoxynivalenol mycotoxin (DON). ► An LMA pectin-gel trapped DON to a greater extent than a LMNA pectin-gel *in vitro*. ► The LMA gel suppressed the absorption of DON from the gut *in vivo*. ► This processing approach is valuable for reducing intoxication by DON present in food.

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Inclusion of quinnestrol and 2,6-di-O-methyl- β -cyclodextrin: Preparation, characterization, and inclusion mode

Original Research Article

Pages 753-760

Da-Wei Wang, Can-Bin Ouyang, Qi Liu, Hao-Liang Yuan, Xiao-Hui Liu

Highlights

► Inclusion complex of quinnestrol and DM- β -CD was prepared under ultrasonic. ► A 1:1 stoichiometry of the obtained complex was confirmed by elemental analysis. ► The inclusion complex was found to significantly increase in water solubility. ► UV-vis, FT-IR, XRD, DSC and SEM were applied to

characterize the complex. ► Inclusion mode of the complex was obtained from both NMR and Molecular modeling.

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Synergetic degradation of konjac glucomannan by γ -ray irradiation and hydrogen peroxide

Original Research Article

Pages 761-767

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Highlights

► KGM was degraded by γ -ray irradiation and hydrogen peroxide for the first time. ► Provide a new way to prepare monodisperse KGM oligosaccharides without purification. ► The mechanism of KGM synergetic degradation was discussed for the first time.

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Editorial Board

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